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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/649,927

08/25/2003

Radovan Kovacevic

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10/20/2004

BAKER BOTTS L.L.P.
2001 ROSS AVENUE
SUITE 600
DALLAS, TX 75201-2980

EXAMINER

EVANS, GEOFFREY S

ART UNIT

PAPER NUMBER

1725

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/649,927	Applicant(s) KOVACEVIC ET AL.	
	Examiner Geoffrey S Evans	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20031229</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. Please note in claim 12 there is no antecedent basis for "the infrared camera".

Please correct.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1,2,11,16, and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Fehrmann et al. in WO 03/070414 A1, filed 10 February 2003. Fehrmann et al. discloses a method for controlling the size of the molten pool by imaging with a CCD camera (e.g. see page 5,line 27) to determine the temperature of the molten pool. This temperature information is used to control the laser power (e.g. see page 10, lines 20-22). Fehrmann et al. further discloses using software tools for this control system (see page 10, last 3.lines) and accomplishing control of the laser based manufacturing process in real time (e.g. see page 10,lines 23-24). Regarding claim 2, Fehrmann et al. discloses that the powder (8) injection is concentric with respect to the cone of captured optical signals (13) from the melt zone (e.g. see claim 16).

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4. Claims 1, 6,8,9,10,11,14-16,24,25, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Koch et al. in U.S. Patent No. 6,122,564. Koch discloses imaging with an imaging device (TV camera 420) a molten pool on a substrate, comparing a physical dimension of the melt pool with a desired target size, and controlling the laser power (see column 7, lines 54-58) in a closed loop manner by using a CAD system to correlate the actual melt pool size with the target size. Regarding claims 6 and 8, Koch discloses a neutral density filter before the camera (see column 6, lines 3-6).

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2,7,17, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch et al. in U.S. Patent No. 6,122,564 in view of Jasper et al. in U.S. Patent No. 6,311,099. Jasper et al. teaches that the melt of the bath is easily detectable with as little interference as possible in the near infrared (820nm to 1050 nm) using a CCD camera (see column 5, lines 3-21) by using filters. It would have been obvious to adapt Koch et al. in view of Jasper et al. to provide this to detect the geometry of the melt bath with as little interference as possible.

7. Claims 3, 4,18, and 19 are rejected under 35 U.S.C. 103(a) as being obvious over Koch et al. in view of Jasper et al. as applied to claims 2 and 17 above and further in view of Hu et al. in the article "Improving solid freeform fabrication by laser-based

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additive manufacturing". Hu et al. teaches using an IR CCD camera that has a frame rate up to 800 frames per second (see figure 4 and the first column of page 1257). It would have been obvious to adapt Koch et al. in view of Jasper et al. and Hu et al. to provide this to acquire images for real time processing.

8. Claims 5,6,8,12,13,17,20,21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch et al. in view of Hu et al. in the article "Improving solid freeform fabrication by laser-based additive manufacturing". Hu et al. teaches using an infrared camera with a high frame rate charge and an imaging resolution of 128x128 (see figure 4 and the first column of page 1257). It would have been obvious to adapt Koch et al. in view of Hu et al. to provide this to obtain adequate resolution of the melt pool geometry.

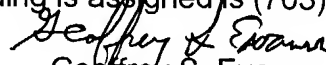
9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Buchin et al. in U.S. Patent No. 6,638,787 has a high frame rate CCD imaging device. Owaki et al. in Japan Patent No. 11-179,578 has a camera (7) with a filter for monitoring the molten pool. Griffith et al. in U.S. Patent No. 6,459,951 uses two cameras (see column 8, lines 42-45) for controlling laser power (see column 10, lines 15-32) in a laser fabrication system. Kim et al. in U.S. Patent No. 6,188,041 has real time weld process monitoring.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey S Evans whose telephone number is (571)-272-1174. The examiner can normally be reached on Mon-Fri 6:30AM to 4:00 PM, alternate Fridays off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571)-272-1171. The fax phone number for the organization where this application or proceeding is assigned is (703)-872-9306.

GSE


Geoffrey S. Evans
Primary Examiner
Group 1700